Opening Speech

Dr Ephrahim Mukisira
Deputy Director, Kenya Agricultural Research Institute (KARI) Headquarters
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The Director of Agriculture and Livestock Development, Distinguished Guests, Ladies and Gentlemen, I am delighted to be here among scientists and stakeholders whose common goal is to develop protocols for registration of biopesticides. As you are aware, biopesticides are pest management tools derived from natural resources that are an important component of the Integrated Pest Management (IPM) strategy. On-farm crop losses due to pests (insects, mites, diseases and weeds) are conservatively estimated at 33 per cent in most tropical developing countries. Further losses occur during harvesting, transportation and storage.

The Kenya Agricultural Research Institute (KARI) strategic plan for 2003–10 as well as the Third Medium Term Plan (MTP III) for the period 2003–08 stipulate clearly the institution's vision and mission to develop and disseminate appropriate technologies for the improvement of rural livelihoods and alleviation of poverty.

In pursuit of these goals KARI undertakes research to enhance food production through improvement of crop germplasm, production technologies and pest management in collaboration with several local and international research institutions.

While a great deal of research on pest management has been devoted to the evaluation of conventional chemical pesticides, the institute has been exploring other strategies including biotechnology.

Research on biopesticides has also advanced with the discovery of fungi, bacteria, viruses and nematodes capable of suppressing important insect pests of crops. Some of these products are at an advanced stage of development as potential biopesticides. Many of these will be reported by scientists from various research institutions during the workshop. KARI is therefore a stakeholder in this workshop that intends to formulate protocols for registration of biopesticides.

I hope during your deliberations you will also have an opportunity to address pertinent concerns relating to patents or intellectual property rights as well as conservation of our country's biodiversity. It is now my pleasure to invite the Director of Agriculture, Dr J.K. Wanjama, to deliver the keynote address.
Keynote Address – Biopesticides as Potential Tools for Pest Management

Dr Joseph K Wanjama
Director of Agriculture, Ministry of Agriculture
P.O. Box 30028
Nairobi, Kenya

Ladies and Gentlemen, it is my sincere pleasure to be here among you distinguished scientists, policy makers and stakeholders at the first Biopesticide Legislation Workshop. I take this opportunity to acknowledge your personal contribution by devoting your precious time to attend this forum. I also wish to thank all who have been involved in planning and providing material and logistic support to make this event possible in a very serene environment.

Some of you may clearly recall the revolution in pest management which was set in motion three and a half decades ago with the discovery of DDT in 1930. In quick succession there followed discoveries of other organochlorines, organophosphates, carbamates and more recently pyrethroids. These chemical pesticides became the main tools in pest management for public health, livestock and crop protection. These discoveries, coupled with improvements in application technologies, made it possible to precisely deliver fairly low concentrations of active ingredients to desired targets with spectacular and rapid suppression of pests.

However as the frontiers of scientific knowledge advanced the intrinsic capacity of the chemicals to kill pests was also found not to be entirely innocuous to other forms of life. The pesticides would also kill non-target organisms such as the beneficial arthropods (predators, parasitoids and pollinators), other invertebrates and vertebrates both in aquatic and terrestrial ecosystems. Some were extremely persistent organic pollutants (POPs) and would undergo bio-accumulation through the food chain. Their active ingredients and degradation metabolites were also found to impair mammalian endocrine systems, nervous systems and some were carcinogens – not to add that some were extremely efficient for intentional suicides. These concerns were raised by lobby groups and finally by legislators who initiated strict restriction on the use of chemical pesticides. Today the dossier required for registration of a chemical pesticide is massive and the related data are expensive to generate as it must adequately allay fears of potential risk to the users, consumers and the environment. An example of the changing scenario can be best drawn from the recent threats to our horticultural produce markets in Europe.

I believe that most of you here are aware of the huge European Union programme for harmonization of the maximum residue levels (MRLs) of pesticides permitted in agricultural produce which started in 1994. In the absence of accepted data on residues by pesticide/crop combinations, most of the conventional older pesticides have had their MRLs set at the limit of detection (LOD) or zero which implies that the pesticides are practically withdrawn or severely restricted from use on crops intended for export to the EU markets. A substantial quantity of horticultural produce originates from the African, Caribbean and Pacific (ACP) countries, which are also ideal havens for pests. The same countries are also subjected to strict phytosanitary and sanitary regulations.
with regard to non-tolerance of pests or related damage in their produce. Here lies the
dichotomy of interest at our export markets that now insist on pest free produce, which
is also pesticide residue free.

Slightly over 92 per cent of our total exports is made up of horticultural produce which
earns over KSh 14 billion annually (1998). Local consumption of horticultural produce
amounts to 95 per cent of the total production. Horticulture is therefore a vital industry
for Kenyans as it provides food, employment, agro-industries and badly needed
foreign capital. While our concerns should include the safety of our local consumers
our export markets are now under threat from the restricted use of conventional
chemical or synthetic pesticides. Acceptable and effective alternative pest control
strategies must be earnestly explored and adopted to save the horticultural industry.
Biopesticides are therefore potential options for pest management if we could develop
the appropriate criteria for their legislation and wider usage. My understanding of
biopesticides is that they are derived from biological sources, exist in nature and are
comparatively benign to the environment. However what is natural does not always
translate to less risk to non-target organisms, vertebrates or humans. If they have the
intrinsic ability to kill or suppress pests they also have the potential to suffer the same
fate as that of chemical pesticides, such as development of pest resistance, concerns of
consumer safety and environmental pollution. They may therefore not be accorded a
clean bill of finding during registration but will be evaluated on the basis of robust
science.

Ladies and Gentlemen, I am convinced that your collective experience and scientific
knowledge will subscribe to the formulation of a blueprint, if not a comprehensive set
of protocols, for legislation of biopesticides in order to utilize fully their potential in
pest management. You may also wish to address other related issues of conservation of
biodiversity, ownership, intellectual property rights, biopiracy, mass production and
quality control. You are the experts and I leave this matter entirely to you.

I hope those visiting this game park for the first time will also take the opportunity to
view some of our wild life.

It is now my pleasant duty to declare the Biopesticides Workshop officially open.

Thank you
Policy Role of Crop Protection Research – Using Research in Policy Making and Implementation

Dr Frances Kimmins
Programme Manager, Crop Protection Programme
NR International
Aylesford, Kent ME20 6SN, UK

The Department for International Development’s Crop Protection Programme (DFID CPP) has commissioned demand-led research on the development of socially responsible and environmentally benign pest management methods since 1995. The identification and development of biopesticides have been major activities for the programme in Africa as well as in Asia and Latin America, but the programme also has an explicit responsibility to promote the uptake of research outputs to achieve outcomes, i.e. to improve livelihood security of poor people. The application of technologies such as biopesticides with minimal or no maximum residue level (MRL) risks in Kenya could potentially have positive impacts on the continued involvement of thousands of smallholders in the export horticulture sector, thus halting the rate of marginalization. Their application could also have indirect impacts on workers employed in the export sector as well as offering new opportunities for enterprise development. To facilitate the adoption of new biopesticides which have been identified we have been analysing successes and failures of earlier promotional projects. We are now aware that to prevent market failure, promotional research projects must, in addition to technology validation, consider the following issues:

1. Be relevant to policies and initiatives supporting technology uptake and agricultural reform OR
2. Provide evidence for decision making and policy support where inadequate information exists
3. Use effective information channels to key stakeholders
4. Broaden the horizons beyond Integrated Pest Management (IPM) projects by linking with other initiatives that can support a broader developmental framework
5. Encourage new partnerships for agricultural enterprise.

It is largely the second and fifth issues that the workshop participants will be addressing over the next three days. Researchers, policy shapers, consultants and industry representatives have been invited to present evidence on the effectiveness, application and registration of biopesticides from case studies based in Kenya, West Africa, India, Thailand, Cuba, EU and Organisation for Economic Cooperation and Development (OECD) countries. I am grateful to the experts for taking part in this endeavour and to our colleagues at Kenya Agricultural Research Institute (KARI) and the Pest Control Products Board (PCPB) for organizing the event, in particular Mrs Mary Wabule, Dr Lusike Wasilwa, Dr Paul Ngaruiya and Peter Opiyo. We hope that the evidence of the experts gathered here today will be captured and utilized to develop policies which will keep the Kenya horticulture sector vibrant, competitive and a key contributor to poverty alleviation.
Demand from Horticultural Industry
Problems Facing the Flower Industry

Ehsani Mehrdad
Kenya Flower Council (KFC)
P.O. Box 56325, Nairobi, Kenya

KFC Position on Biopesticide Legislation

The flower industry is very valuable to the Kenyan economy:

- Over 100,000 jobs created directly and indirectly
- 50,000 tonnes of flower exported last year
- Although flower growers represent only 0.0003% of Kenyan arable land they have an annual turnover of US$130 million
- Kenya is largest exporter to the EU – 25% of market share
- Horticulture sub-sector is the 2nd largest foreign exchange earner for the Kenyan economy.

We need the support of the Kenyan Government if we are to maintain this enviable position in the EU market. Specifically the industry needs efficient biopesticide legislation to help it retain its market share.

Biopesticides, macrobial and microbial biological agents are important to the flower industry for several reasons:

Market Forces
Consumers in Europe are concerned about the amount of pesticides used in horticulture – especially with the possible negative impacts on the environment. Therefore growers are under pressure to reduce pesticide use. We anticipate a time when maximum residue levels (MRLs) may also be applied to ornamentals (as they are now in vegetables and fruits) and we stand to lose our markets if we cannot meet these demands. Since biocontrol of pests requires substantially more expertise and management, the industry wishes to have the opportunity to start learning about using these technologies as soon as possible. Kenya’s main competitors already have access to these technologies and further delay could lead to loss of competitive advantage.

Health and Safety
The flower industry has received a lot of bad press regarding alleged excessive use of pesticides and the endangering of the health of flower farm employees. Civil society groups especially have waged a damaging campaign against the flower growers and we stand to lose our markets if we are not able to adopt biocontrol measures.

Re-Entry Intervals
The re-entry intervals set by the World Health Organization (WHO) for when it is safe to enter a greenhouse after spraying is finished are shown below:

<table>
<thead>
<tr>
<th>WHO Class</th>
<th>Label</th>
<th>Re-entry Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Ia</td>
<td>RED LABEL</td>
<td>36 hours</td>
</tr>
<tr>
<td>Class Ib</td>
<td>RED LABEL</td>
<td>18 hours</td>
</tr>
<tr>
<td>Class II</td>
<td>YELLOW LABEL</td>
<td>12 hours</td>
</tr>
</tbody>
</table>
Who Class III BLUE LABEL 4 hours re-entry interval – or when leaves are dry
Who Class IV & V GREEN LABEL 4 hours re-entry interval – or when leaves are dry

The high re-entry intervals (e.g. 36 hours for Class 1a chemicals) greatly interfere with the harvesting operations. However, using macrobial natural enemies has no re-entry intervals and hence harvesting can continue uninterrupted.

KFC Recommendations for Biopesticide Legislation

Enabling Environment
Friendly Legislation that encourages investment into the development of biocontrol is very important. We seek a partner in the regulatory institution – not a policeman.

Indigenous natural enemies are exempt from registration under international pest control acts

We do not see justification for Kenya veering away from this international standard.

Potential Conflict of Interest
The development and commercialization of this biotechnology will create opportunities and perceived threats to different groups in the marketplace. We would like appropriate checks and balances to be put in place so that parties with a vested interest are not able to unfairly influence the registration process.

Fast-tracking Registration
In the event that it is decided that any of the microbials, macrobials or botanical pesticides require registration, we suggest that the granting of temporary permits be considered so that the industry does not suffer long delays in access to these technologies. We understand that almost 50 per cent of the agrochemicals used in Kenya are on temporary registration – so there seems to be a precedent to allow for this.

Fear of Interception
There seems to be fear among some growers and exporters (whether unfounded or not) that consignments of flowers that have indigenous natural enemies may be impounded in the EU until the insects are identified, which could take three to seven days. This would be disastrous for flowers as the quality of the product would diminish substantially in this kind of time period. Written confirmation from EU phytosanitary inspection institutions that consignments will not be intercepted or subjected to lengthy identification processes if natural enemies are present will go a long way in reassuring growers.
Problems Facing the Vegetable and Fruit Industry

Cecily Kariuki
Fresh Produce Exporters Association of Kenya (FPEAK)
P.O. Box 40312, Nairobi, Kenya

Industry Background

The vegetable and fruit industry is an important agricultural sector in Kenya. Currently the total production stands at 3,500,000 tonnes. Most of the produce is consumed locally, but a significant proportion is exported. The value and volume of exports has continued to rise over the years as shown in Table 1 and Figure 1. Total value of exports in 2002 was KSh 120 million and production was over 110,000 tonnes. Growth forecast for 2003–05 is 140,000 tonnes.

Table 1: Value of horticultural exports from 1997 to 2002, Kenya

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<tbody>
<tr>
<td>Flowers</td>
<td>35</td>
<td>31</td>
<td>38</td>
<td>41</td>
<td>52</td>
</tr>
<tr>
<td>Fruits</td>
<td>17</td>
<td>12</td>
<td>15</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Vegetables</td>
<td>36</td>
<td>15</td>
<td>46</td>
<td>35</td>
<td>46</td>
</tr>
</tbody>
</table>

Figure 1 Production of horticultural exports in Kenya from 1997 to 2002

Sector's contribution to the economy:

- Increased food self sufficiency, food security, improved nutrition
- 2nd largest foreign exchange earner – in 2002 the industry earned US$300 million
- Employment creation to both the rural and urban population estimated at 500,000 and over 2 million directly and indirectly respectively.
Food Safety Called into Question

Public opinion is concerned about problems of the safety of foods. Serious crises have occurred in various sectors of European agriculture, amply relayed by the media. Consumers, extremely aware, expect the institutions to implement regulatory provisions ensuring optimal protection of their health and the business world to demonstrate that their practices are duly complying with the provisions.

The Governments of the EU member States and the European Commission have made the safety of food their priority. In so doing, they have:

- undertaken a review of the regulations dealing with pesticides maximum residue limits (MRLs) and authorized use of pesticides with the EU
- generalized the assessment systems for environmental and health risks linked to the use of chemical products
- strengthened controls at the food production stage, pursuing their audits into the supply chain in order to identify the origin of the misdemeanours observed.

Faced with new legal orientations the regulators have transferred the burden of proof to the private sector, and those who cannot prove that they have taken every possible precaution to avoid any contamination of the fruit and vegetables that they export and sell to consumers will have to be phased out of the supply chain. Further, those contravening EU regulations can be inflicted with heavy sanctions (two years of imprisonment and a fine of nearly US$40,000 per consignment).

For these reasons, European buyers are requiring of their suppliers every guarantee of traceability and the safety medical conformity of their fresh fruit and vegetables.

ACP-EU Horticultural System in Danger

In the face of the increased demands made of their suppliers by the European buyers, there are risks that the commercial links between the various players in the African, Caribbean and Pacific-European Union (ACP-EU) horticultural system will be severed. These risks are particularly great with regard to the residual pesticide thresholds (MRL) to be complied with, especially when these MRLs have been set at the detection threshold ‘Limit of Detection’ (LOD – the equivalent of analytical zero).

This means that no detectable trace of residue will be tolerated. The regulatory changes within the EU can seriously impact the Kenyan economy unless the safety conformity of the fruit and vegetable exported in the EU is demonstrated.

The exporters, who in order to prove the traceability and quality of their export-oriented produce, are going to restrict, even suspend, their suppliers from producers that do not adopt agricultural practices that conform, with the smallest being the most vulnerable.

While appreciating that the use of pesticides is indispensable for the great majority of tropical horticultural production, the industry faces the challenge of demonstrating conformity to set MRLs at every stage, in a coordinated and credible manner. This is why the subject of biopesticides has become so dear to us and we must now move from mere rhetoric and act. In this respect, this workshop could not have been timelier.
Problems

Food safety is being called into question, leading to MRLs being set in the EU. ACP-EU horticultural system is in danger and under pressure relating to usage of synthetic pesticides as well as social accountability for workers who come into contact with pesticides. Stakeholders and regulators are not being tuned to the use of biopesticides, while adjusting to change is slow. Enabling policies and systems need to be set up to facilitate the utilization of biopesticides.

The Way Forward

Immediate

- Knowledge and wisdom from unbiased players should be utilized in the use of biopesticides.
- Enabling policies and systems need to be set up to facilitate the utilization of biopesticides.
- Pest Control Products Board (PCPB) should allow the use of biocontrol agents on trial basis.

Medium to Long-term

- Awareness regarding economic and safety benefits of biopesticides to stakeholders should be intensified. This should cover both export and domestic horticulture.
- Strategies to export biopesticides to other countries, especially in the COMESA region, should be explored.

Discussion

Comment

The ability of biopesticides to support small-scale farmers and ensure secure production of staple food crops in Kenya (3,500,000 tonnes) has been confirmed by the Cubans. Cuba does not have an important horticultural export market but it has a substantial biopesticide industry which supports small-scale farmers and has reduced pesticide imports by 86%. Biopesticides are usually the most expensive type of pesticides in Europe but Cuba has developed policies and production systems that make them available and small-scale farmers. If the same reduction in pesticide imports were achieved in Kenya as in Cuba, this would be a possible annual waiving of £35 million pounds per year of foreign exchange.

Kenya horticultural exports account for US$300,000,000. The export market customers demand a reduction in pesticide use. In order to maintain (not to expand) on essential export market we must reduce; the Dutch Government some years ago set a national target to reduce pesticide use by 50% over five years. These targets have been met and pressure to reduce pesticides has continued in Europe.

Kenya horticultural industry needs the support of the Kenya Government in policy development to ensure reduction in pesticide use and continued contribution of the flower and vegetable industry to the Kenyan economy.
Comment
Only 3% of horticultural produce is exported and therefore there is a need to look at local consumption in the use of biopesticides and not just what is destined for the export market.

Response
FPEAK is interested in the high value export market as compared to the local low value market. However, this session should address the issue of use of biopesticides for produce meant for the local market.

Comment
Cuba has extensive use of biopesticides and their local production has benefited a lot. The use of biocontrol agents should be promoted locally.

Response
It is up to the committee to look into this issue. Import companies normally conduct audits on use of pesticides and therefore farmers cannot grow both for local market and for export market.

Comment
On the issue of resisting change, biopesticide companies should market as aggressively as agrochemical companies. However, research should be done on biopesticides. Such research should be prioritized by research institutions and stakeholders should help in formulating priorities.

Response
A national MRLs committee has been set up and one of the issues that it will address is the use of biopesticides.

Comment
The flower industry is very important to the economy and Dudutech is working with the industry to reduce pesticide use. There has been criticism by human rights bodies. Dudutech will spend US$800,000 in 2003 for development of biocontrol agents.

Comment
We are encouraging the use of biocontrol agents and we have contacted the UK regarding which biocontrol agents are acceptable, however, caution is being employed in the use of biocontrol agents. We will work closely with the EU to get a list of acceptable biocontrol agents.

Comment
There should be no fear of interception of produce because natural enemies are known. In the EU there is immediate identification of the natural enemies and therefore produce is not detained at the point of entry.
Commercial Opportunities for Biopesticides

Richard O. Sikuku
Agrochemicals Association of Kenya
P.O. Box 13809, Nairobi, Kenya

Introduction

The Agrochemicals Association of Kenya (AAK) is the national representative of the International Agrochem Industry represented worldwide by CropLife International (formerly GIFAP). AAK is, therefore, the umbrella organization in Kenya for manufacturers, formulators, re-packers, importers, distributors, farmers and users of pest control products (pesticides). The local association has existed under various names, with the most recent being Pesticide Chemicals Association of Kenya (PCAK), since 1958.

The Association, through an elected Executive Committee, runs the affairs of the Agrochemical Industry locally using the following objectives:

1. Promote public education concerning the use of pesticides safely
2. Provide an agency for liaison with Government and others, on all matters of mutual interest
3. Consider and deal with matters relating to customs duty, registration and labeling of pesticides, setting of standards in pesticides, following safety codes and promotion of the FAO Code of Conduct on distribution and sale of pesticides
4. Protect common trade interests of its members, where these are concerned with the manufacture, formulation and distribution of pesticides
5. Cooperate with all agencies seeking the improvement of Kenyan Agricultural and Pastoral Production and Environment
6. Encourage and promote just, fair and honorable practice, and oppose malpractice and illegal practices in the operation of the industry
7. Work with the Government towards the regulation and importation of pesticides
8. Encourage research in all areas that will improve the effective use of pesticides.

All these objectives of the Agrochemical Industry were put in place after the industry recognized that it has social and environmental responsibilities to the consumer, user/worker and environment in general in control of pesticides.

Management of the Association

Membership

Membership to the Association is open to those in the following categories:

a) Full Membership

Full membership of the Association shall be open to any person or organization in Kenya falling under any of the following:
Registration for Biocontrol Agents in Kenya

i. Manufacturers of active ingredients used in the formulation of agricultural chemicals and related products

ii. Formulators contracted to manufacturers of active ingredients used in the formulation of agricultural chemicals and related products

iii. Contracted representatives of manufacturers of active ingredients used in the formulation of agricultural chemicals and related products not otherwise represented in Kenya

iv. Local manufacturers, formulators and re-packers of pesticides.

b) Associate Members
This shall be open to those persons or corporations involved in the distribution and/or usage of pesticides and related products originating from suppliers described under sub-paragraph (a) above or other sources registered with Pest Control Products Board.

c) Growers and Parastatals
This shall be open to any grower or farmer or parastatal engaged in agricultural production.

d) Non-Resident Membership
This shall be open to any manufacturer, trader or person who is not based in Kenya but is marketing pesticides through an appointed agent or agents.

The Executive Committee

a) The Executive Committee of AAK is responsible for the management of the Association. It is composed of the following:
   • Chairman
   • Vice-chairman
   • Treasurer
   • Assistant Treasurer
   • 4 members representing full members
   • 2 members representing associate members
   • 2 co-opted members
   • Secretary.

b) The Executive Committee operates through the following sub-committees:
   i. Ethics and Government Liaison Sub-Committee
   ii. Finance Sub-Committee
   iii. Training Sub-Committee
   iv. Environmental Sub-Committee
   v. Publicity, Recruitment and Dealer Accreditation Sub-Committee
   vi. Veterinary Sub-Committee.

c) Responsibilities of Sub-Committees
   i) Ethics and Government Liaison Sub-Committee
      • Maintains discipline among its members by enforcing the constitution and the code of practice
      • Provides an agency for liaison with government and other agencies on all matters of mutual interest
      • Deals with the registration and labeling requirements.
ii) **Finance**
   - Looks after the finances of the Association, which will include budgeting and location of funds to various activities.

iii) **Training**
   - Co-ordinates all training activities of the Association
   - Promotes public education concerning the safe use of pesticides.
   - Works closely with other organizations dealing with training.

iv) **Environmental**
   Looks into:
   - Packaging standards
   - Obsolete stocks
   - Pictograms and colour codes
   - Transportation requirements of pesticides
   - Poison centres and supply of antidote kits
   - Protective clothing.

v) **Publicity, Recruitment and Dealer Accreditation**
Handles:
   - Publicity of the Association’s activities and those contravening the Pest Control Products Act and AAK Code of Conduct
   - Recruitment of new members
   - Accreditation of dealers, sales representative, transporters and all other people involved in pesticides.

vi) **Veterinary Sub-Committee**
Deals with:
   - Co-ordination of all environmental matters of animal health products
   - Development and co-ordination on the guidelines on training in animal health
   - Any other matter that touches on animal health.

### Commercial Opportunities for Biopesticides

The International Agrochemical Industry is made up of National Agrochemical Associations, Regional Associations and the International Association (which, in the case of Kenya, is made up of Agrochemicals Association of Kenya, CropLife Africa Middle East and CropLife International), and has the main object of promoting environmentally sound use of agricultural chemicals for the economic products of safe, high quality abundant food, fibres and other crops/livestock. This shows that the Agrochemical Industry has the responsibility of continuing to provide safe and effective products as far as the users, consumers and the environment are concerned. The industry must also promote the use of biopesticides, which play a role in the production of safe crop and livestock products.

A number of AAK member companies are already exploiting commercial opportunities existing in the Kenyan market. This has been necessitated by the new EU regulation of maximum residue levels (MRLs) which has made farmers go for appropriate pesticides in the critical windows within the production cycle.
Registration for Biocontrol Agents in Kenya

The specific ‘windows’ within the crop production cycle are:

(i) Land preparation to planting
(ii) Planting to start of flowering
(iii) Start of flowering to start of harvesting
(iv) Start of harvesting to end of harvesting.

The synthetic pesticides should be used more towards the start of the cycle and biological pesticides towards the end.

Discussion

Question
What is the annual turnover of agrochemical sales in Kenya?

Answer
4,000,000,000 KSh/year

Question
What proportion of turnover can be attributed to biopesticides?

Answer
The figures were not known but were estimated at less than 2%.

Question
What work do AAK have to achieve their objectives?

Answer
AAK works through Ministry of Agriculture extension staff countrywide. AAK has also trained farmers, Ministry of Agriculture staff, etc.

Question
How does AAK strategically view the development of IPM since it inevitably leads to reduction in use and sales of pesticides?

Answer
AAK has been involved in ‘safe use’ of pesticide training for many years and already promotes IPM.

Question
Meeting your objective requires that you have an elaborate extension system, which as a small association you may not have. What linkages do you have with the public and/or private extension providers?

Answer
AAK will continue to work with partners in the agrochemical industry in Kenya.

Comment
The AAK presentation on share of biopesticides points to the need to have ‘softer’ regulations to promote biopesticides. It is appropriate to emphasize that biopesticides should be ‘specially’ encouraged as they have less market turnover per shilling invested.
Implementing IPM in Kenya: Products and Services

Louise Labuschagne*

Dudutech
P.O. Box 10222, Nairobi, Kenya

Introduction

Dudutech is Kenya’s first Integrated Pest Management (IPM) Company. It was inaugurated in May 2001, and is able to offer a full range of IPM products and services to the Kenya horticultural industry. Dudutech employs 90 staff, of whom 34 are Kenyan graduates working in natural enemy production (indigenous predators, parasitoids and entomopathogenic nematodes), microbiologists developing indigenous biopesticides (naturally occurring insect-specific diseases) and field staff undertaking IPM trials and developing advisory skills to support growers. It has a training department with three full-time staff, who run examined courses for small- and large-scale growers throughout the country in conventional pesticide use as well as unique crop specific IPM courses.

In the space of three years, Dudutech has developed IPM products and protocols which have enabled its sister company, Homegrown (K) Ltd., to eliminate completely the use of organophosphates, carbamates and organochlorines from its vegetable production. Dudutech is beginning an intensive programme aimed at doing the same thing in flower crops over the next two years. Homegrown is the largest horticultural export company in Kenya. The export market customers are demanding a reduction in pesticide use, whether it is on vegetable or flower crops. The EU legislation on pesticide maximum residue levels and the requirement for produce to company with EUREP GAP means that Kenya must adopt IPM in order simply to maintain its essential foreign exchange earnings from horticultural export sales. IPM is being developed in all other producer countries in Africa with whom we are competing fiercely just to maintain our market share. No expansion of the Kenyan horticultural export market will be sustainable based on out-dated conventional pest control programmes, which rely on intensive pesticide use. The future is IPM – there is no turning back. In order to compete in the export market we must have an enabling environment for IPM in Kenya.

Role of Regulatory Authorities

The regulatory authorities involved in registration have a pivotal role in this, in making IPM products available to growers with least bureaucratic delay. Regulatory authorities in other countries recognize that the pesticide regulations are not relevant to biological control agents. As a result, the Pest Control Acts have been amended to facilitate faster uptake of IPM products such as indigenous natural enemies (predators, parasitoids and entomopathogenic nematodes) and physical controls (starches, oils and detergents, etc) as well as products that are generally regarded as safe (GRAS) (vinegar, sodium bicarbonate, plant oils, etc). Their Pest Control Acts have been

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amended to specifically exempt all of these types of products from having to comply with the Pest Legislation, including that of labelling. Dudutech has provided copies of these Acts and the exemptions contained herein to the Kenyan authorities. Pesticide Chemicals Association of Kenya (PCPB) is currently amending the Pest Control Act and Dudutech has not been advised if it was decided to amend the Kenyan Act in line with international norms. This meeting will be an opportunity for PCBP to bring participants up to date on progress.

Unlike all other countries, Kenya has insisted that the Dudutech indigenous natural enemies must be registered. The data package requirements have not been discussed by the Registrations Committee hence there was some confusion and delay in finalizing the documentation required. The process has taken from October 2002 and PCPB has still not given Dudutech permission to sell Kenyan indigenous natural enemies to the Kenyan horticultural market. Zambia, Zimbabwe and South Africa are all developing a natural enemy mass-production capability. If we do not provide an enabling environment, the ability of the Kenyan horticultural industry to compete internationally will be seriously jeopardized, without any additional safeguard to the environment being provided by the delays.

### Need for Registration

Biopesticides are a different type of biological control agent from natural enemies, which should not be exempted in the same way from registration, unless the agents work purely as biofertilizers, by promoting growth of healthy plants able to withstand pest and disease attacks. The need for registration and the extent of the data package for individual biopesticides should be made on risk assessment. Internationally there is much experience on risk assessment and Dudutech welcomes this initiative to discuss these issues with the Kenyan industry and authorities. Legislation should be designed to protect the environment as well as consumers and operators. If there is no measurable risk attached to the use of specific biopesticides, Dudutech would urge the Kenyan authorities to make use of these guidelines in providing a transparent enabling environment for the registration of biopesticides as well as natural enemies in Kenya.

### Discussion

**Question**
What percentage of synthetic pesticides has Homegrown stopped using?

**Answer**
Organophosphates, carbamates and organochlorine compounds have been reduced by 2,000 kg to 0 kg usage.

**Question**
How do you intend to address registration issues?

**Answer**
We have provided all requirements to PCPB, but we are waiting for feedback. We do not intend to file patent application.

**Question**
What benefit sharing arrangements exist with Government? How do you intend to tackle benefit sharing as contained in [3] and TRIPS?

**Answer**
These issues are always taken into considerations when planning our activities.
Neem-Based Pesticides and Registration Requirements

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Introduction

Although the benefits derived from the neem tree have been known for over 5,000 years in India, it is only in the past 30 years that these have been accepted in the western world. It was due to the efforts of Prof Heinz Schmuttrerer, a lecturer in the University of Nairobi in the 1960s and later professor of entomology in the University of Giessen, Germany, that information on neem was broadly distributed. This was through PhD and masters theses on various aspects of neem written by his students. In Kenya, Saroc Ltd., later called Saroneem Biopesticides Ltd., was the implementer, in 1996 of the production of neem extracts as pest controllers. In fact, although the tree had been on the continent for several hundred years, this was the first time that the industrial and commercial potential of the plant was exploited in Africa.

Mode of Action

Neem biopest controllers work in four basic ways:

1. Neem kills certain insects at early instar.
2. It is an anti feedant. This means that not only are insects repelled by the taste or the smell of the plant that has been sprayed, but neem also brings on a type of bulimia whereby the insect loses its appetite if it perches on the leaf and, in fact would starve to death if it remained long enough.
3. Neem has a genetic effect, in that the offspring of affected insects do not grow true to type. They may have no wings or no mouth and thus are unlikely to survive.
4. Finally, and most important, it has little effect on the predators and parasitoids that prey on insects that destroy crops.

Registration

The neem molecule contains 99 terpenoids or limonoids. Of these, the most important are azadiractin, nimbin and saladin. Most registration organizations require the presence of azadiractin to determine the efficacy of the insect controller. However, this is not correct as neem oil has virtually no azadiractin but contains considerable amounts of the other two limonoids as shown in Table 1.
Table 1: Limonoid content of neem seed cake and neem oil

<table>
<thead>
<tr>
<th>Limonoid</th>
<th>Limonoid content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cake</td>
</tr>
<tr>
<td>Azadiractin</td>
<td>0.8</td>
</tr>
<tr>
<td>Nimbin</td>
<td>0.8</td>
</tr>
<tr>
<td>Salanin</td>
<td>0.4</td>
</tr>
</tbody>
</table>

It is therefore recommended that any high performance liquid chromatography (HPLC) analysis registers not only the azadiractin but also the contents of nimbin and salanin in order to determine the efficacy of the pest controller.

As biopesticides are mostly produced by young enthusiastic companies with limited financial resources, it is recommended that toxicological data from other sources be permitted to be utilized as carrying out specific studies is too onerous to permit many companies to register their products. These studies have often been published in scientific papers and are available for all to study.

**Discussion**

*Comment*
The chemistry of neem is complicated, making simple chemical standardization of neem difficult.

*Response*
This is so.

*Comment*
Because of complex action and neem ‘sample knockdown’, efficacy tests may be appropriate tests to suit the mode of action and the product.

*Response*
Agreed.